

Adopted: March 3 2009

**ACADEMIC SENATE
of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA**

AS-679-09

**RESOLUTION ON
PROPOSAL FOR THE ESTABLISHMENT OF
THE GLOBAL WASTE RESEARCH INSTITUTE**

- 1 RESOLVED: That the Academic Senate of Cal Poly endorse the establishment of the **Global**
2 **Waste Research Institute** as summarized in the attached proposal.

Proposed by: College of Engineering
Date: December 11, 2008

Global Waste Research Institute

**Proposal to California Polytechnic
State University**

James L. Hanson and Nazli Yesiller

October 24, 2008

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INTRODUCTION

Hundreds of millions of tons of wastes and byproducts are generated in the U.S. as well as many other parts of the world on an annual basis. The common categories of wastes are municipal solid waste (MSW), hazardous waste, agricultural waste, mining waste, medical waste, incinerator ash, electric power plant ash, and radioactive waste. These various categories of wastes contain contaminants that pose different levels of risk to human health and the environment. Byproducts are generated due to activities associated with all major industries (e.g., automotive, electronics, steel manufacturing, oil exploration, power generation, chemical manufacturing, packaging).

Significant advancements have been made in the management of wastes and byproducts in recent decades. Containment technologies have been developed in the U.S. in response to the promulgation of major environmental protection laws. Prescriptive designs for containment systems are used commonly due to the high regulatory involvement. Recycling of wastes and reuse of byproducts have also developed significantly in the U.S. While U.S. is a leader in the development of materials, designs, and construction schemes for containment applications, recycling and reuse has been underdeveloped in comparison to other industrialized countries. Ever increasing quantities of wastes require new and improved technologies for reduction, recycling, and reuse. Continual technological innovations and emergence of new industries also require development of new strategies and adaptation of existing methods for improved management of wastes and byproducts. Major examples of new and emerging industries that contribute to the new waste and byproduct streams include biotechnology, nanotechnology, and genetics. These industries produce and dispose of materials such as nano-particles and biological matter with properties and responses dramatically different than conventional materials. In addition, growing concerns on greenhouse gas emissions coupled with progress in the alternative energy industry require improvements in the existing waste and byproduct management methods. The large quantities of wastes and byproducts generated are major stressors for the containment infrastructure, in particular as the long-term effectiveness of these systems are not well known. Significant amounts of wastes and byproducts can be used/reused in a beneficial manner, if more efficiently managed. Overall, a significant need exists for focused research and development in the waste and byproduct management fields.

The Global Waste Research Institute is proposed to be established at California Polytechnic State University in San Luis Obispo (Cal Poly) to advance sustainable management and beneficial use of residual wastes and byproducts. The Institute will develop anticipatory solutions for sustainable management of wastes and byproducts in the 21st century. The formation of the Institute is timely and strategic to foster multidisciplinary approaches in research, development, education, and policy assessment and implementation. The rationale for establishing the Institute is provided below:

- ❖ Cal Poly has a critical mass of faculty members with expertise and interests in various topics related to waste management and recycling and reuse of wastes and byproducts. The majority of the current contributing faculty is from the College of Engineering with additional faculty members from the Colleges of Science and Mathematics; Agriculture, Food, and Environmental Sciences; Business; and

Architecture and Environmental Design (each of which may take lead position on a specific project).

- ❖ The Institute will represent the only example of its kind in California. Also, the Institute will be one of the very few waste and byproduct related institutes in the U.S. The proposed Institute differs from the other institutes due to its broadly encompassing mission, diversity of resources, and thematic research and education areas.
- ❖ The highest amount of wastes and byproducts on a per state basis in the U.S. is generated in California in proportion to the population and industrial activity. Preliminary contacts made with the California Environmental Protection Agency indicate strong interest in the Institute initiative. Similarly, regulatory activity and interest in technological advancements, alternative energy technologies, and reduction of emissions and associated use of carbon credits in California as well as globally provide potential support mechanisms for the Institute's activities in these areas. Progressive attitudes and attributes in California for protection of the environment provide viable pathways for conducting successful research projects with high and sustainable impact.
- ❖ The Institute has established a priority for sustainability in its activities in line with the commitment of Cal Poly to pursue sustainability in teaching, research, professional service as well as campus life.
- ❖ The Institute will contribute significantly to graduate education, which is a focus area for strategic development for Cal Poly. Research projects conducted by Institute faculty will provide assistantship opportunities for students. The Institute will facilitate the development of a multidisciplinary Masters Program in Management of Wastes and Byproducts. Faculty members from the Institute will actively participate in teaching and student advising in the new program.
- ❖ The Institute will provide training for various stakeholders (students, professional community, regulators, general public) in sustainable waste and byproduct management in California and elsewhere, and contribute to the overall educational focus and Learn By Doing mission of Cal Poly.
- ❖ The Institute will establish working relations with foreign entities (including educational institutions, industry, and government agencies) to take advantage of complementary aspects of the expertise of researchers from Cal Poly and other countries as well as the research infrastructure within the university and of other countries. The Institute will promote joint research and educational studies as well as training programs with foreign countries supporting the global initiatives at Cal Poly.
- ❖ Recycling, reuse, and containment of wastes and byproducts affect all members of society. Advancements made in these fields through the activities of the Institute will provide sustainable use of resources and better environmental protection and thus, improve the well being of the public in California, in other states, and elsewhere in the global community.

- ❖ A commitment for a significant amount of financial support for the Institute has been provided as detailed in Funding and Budget Section and Appendix A. In addition, two individuals, Mr. Robert Davis (Cal Poly – Math '65) and Dr. Nazli Yesiller (Lecturer and Volunteer Faculty, Civil and Environmental Engineering Department), have made significant commitments to the Institute initiative and have been working in collaboration to establish priorities and contacts for the Institute. Detailed information about Mr. Davis and Dr. Yesiller are provided in the next several sections.

STRATEGIC PLAN

The main objective of the Global Waste Research Institute (Institute) will be to develop comprehensive solutions to existing and emerging issues in management of large quantities and wide varieties of wastes and byproducts. The Institute will bring together experts from complementary disciplines to investigate complex management problems associated with wastes and byproducts. While the Institute will have a main focus of research, various educational activities will be pursued to align with Cal Poly's commitment to education. The Institute will facilitate and contribute to the development of a Master's Program in Sustainable Environmental/ Waste Management with a progressive multidisciplinary curriculum. The new program will be administered by the Civil and Environmental Engineering department with contributions from other departments in the College of Engineering and other Colleges at the University. Other related graduate programs are envisioned as part of the scope of the Institute (such as joint MS/MBA or MS/Public Policy degrees). The Institute will strive to disseminate scientific discoveries resulting from the research studies by generating various categories of publications (reports, papers, guides, recommendations, test methods, etc); by providing presentations at high profile conferences and seminars; by education and training activities; and by interactions with industry and regulatory agencies for rapid technology transfer and policy implementation. By conducting high caliber research and effectively disseminating the research findings, the Institute will gain high profile recognition both nationally and internationally. We envision holding a major conference series at Cal Poly as part of the Institute activities. A potential candidate is the recently established joint Global Waste Management Symposium and Intercontinental Landfill Research Symposium. The inaugural symposium will be held in Colorado in 2008. We have established a high priority to permanently bring the bi-annual symposia to Cal Poly.

Mission Statement

The mission of the Global Waste Research Institute at California Polytechnic State University is to advance state-of-the-art and state-of-the-practice in development of sustainable technologies and policies for management of existing, new, and emerging wastes and byproducts through relevant and complementary research, development, and education. The Institute shall operate at the forefront of engineering, science, and business to develop products, processes, practices, and policies through conducting innovative research and educating stakeholders.

To accomplish its mission, Institute members will seek external funding for research, development, and education projects. In addition, the Director and Executive Committee will pursue donations to support Institute operations and activities, including specific projects carried out by Institute faculty. The priorities of the Institute will include investigation of properties and behavior of wastes and byproducts through theoretical analysis, experimental testing, and numerical modeling; investigation of multi-phase mobility of wastes and byproducts in the environment; development of containment, treatment, and reuse strategies; development and dissemination of theories, processes, and products for management of wastes and byproducts; marketing of innovative and economically viable technologies;

investigation of socio-economic implications of management strategies; and policy-making for sustainable management of wastes and byproducts.

Priority activities for the Institute during its initial years of operation will include: developing formal proposals to secure external funding beyond existing initial commitments; providing seed funding to faculty affiliated with the Institute to promote large-scale collaborations and associated proposals; facilitating and contributing to the development of the Master's Degree Program in Sustainable Environmental/Waste Management; establishing a flagship conference series associated with the Institute; and developing partnering relationships with California-based, national, and international organizations.

Thematic Research Areas

The Institute will be established to develop sustainable strategies and technologies for management of residual wastes and byproducts. Specific focus areas for research will include:

- Assessment of trends for generation, recovery, recycling, and disposal of existing, new, and emerging wastes and byproducts.
- Development of methodologies for recovery, recycling, and management of specialized waste streams such as e-wastes, scrap tires, agricultural wastes, military wastes, and high moisture content wastes.
- Identification, assessment, and technological development of processes for handling of wastes and byproducts associated with emerging industries such as biotechnology, nanotechnology, and alternative energy.
- Assessment of existing approaches and development of new applications and technologies for use of recyclable materials and byproducts.
- Development of management strategies and engineering/scientific solutions for wastes at various levels of governance.
- Investigation and development of energy recovery and conversion technologies for wastes.
- Investigation of long-term and field-scale performance and effectiveness of existing waste containment systems.
- Investigation of impacts of containment facilities on the global environment including effects on air quality as well as carbon balance in the environment.
- Development of new approaches for management of legacy wastes.
- Development of innovative materials and systems for waste treatment and containment.
- Numerical modeling and model verification of processes and systems related to optimization of waste treatment, conversion, and containment.
- Investigation of post-closure no maintenance ("walk-away") and perpetual containment systems.
- Development of versatile (e.g., inert, low impact, mobile, low cost) alternatives for diverse waste management and disposal needs (e.g., extreme climates, military activities, remote locations, environmentally sensitive areas, underdeveloped regions).
- Development of specific designs for waste management solutions for developing countries.
- Development of an inventory of instrumented field sites with industrial partners for assessment of various aspects of management of wastes and byproducts.

- Development of manufacturing and processing strategies to minimize waste production.
- Conducting life-cycle assessments for a wide variety of products with regard to environmental impact and resource utilization.
- Investigation of financial impacts associated with reduction, recycling, and reuse of wastes and byproducts on carbon credits trading.
- Investigation of the economic aspects of alternative containment system designs.
- Market development for recycled and reused wastes and byproducts.

Thematic Education Areas

The Institute will provide relevant education for stakeholders including students, educators, practitioners, regulators, policy makers, and the general public. Specific focus areas for education will include:

- Facilitating development of extensive course programs, degree alternatives, and research opportunities at Cal Poly in engineered, scientific, and economic management of wastes and byproducts for undergraduate and graduate students.
- Establishment of industry partnerships to develop specific solutions to waste and byproduct related problems using undergraduate and graduate students in a project based learning environment.
- Development of workshops, seminars, training courses at various levels of technical competency for practitioners, regulators, and policy makers.
- Development of course modules for K-12 and undergraduate and graduate education.
- Development of teaching aids for K-12 educators and university professors.
- Development of outreach materials for the general public that can be used by various constituents including regulators, waste management industry, consultants, as well as educational institutions.
- Provision of learning opportunities for developing multidisciplinary solutions to global waste management problems.
- Development of reports, manuscripts, theses, guidelines, standards, databases, and web-based materials for technology transfer.

ORGANIZATION AND GOVERNANCE

The Institute will be governed by a Director in collaboration with an Executive Committee that consists of select members of the Institute. The Director and the Executive Committee will be assisted by the member faculty of the Institute. The committee and members will include faculty representing multiple disciplines from the College of Engineering and other Colleges with synergistic relationships to the Mission of the Institute. The Director will be responsible for managing day-to-day operations of the Institute as well as coordinating and pursuing funding opportunities. It is expected that the Director will be an active researcher. A high-functioning Director is envisioned who can handle both research and operational tasks associated with the Institute. The Director will also be involved in supervising her own or collaborative research projects as well as disseminating research results through reports, papers, presentations, and other venues. The dissemination of results relates to both the Director's own research (in conventional journal and conference settings) as well as to broad results of all faculty participants in the Institute (for fundraising purposes associated with the Institute). In addition, the Director will manage general dissemination activities including seminars, training courses, workshops, and conference organizations. This Institute proposal was prepared in collaboration between Dr. James L. Hanson and Dr. Nazli Yesiller, who are married. Appropriate actions will be taken in the governance of the Institute to prevent any conflict of interest and to fully abide by Cal Poly regulations. The Dean of Engineering will act in supervisory capacity as needed.

The Interim Director of the Institute will be Dr. Nazli Yesiller. Dr. Yesiller is a civil engineer with a specialty in geoenvironmental engineering. She received her Ph.D. from the University of Wisconsin-Madison in 1994. She completed a Post-Doctoral assignment at the same university in 1995. She was initially an assistant professor and then a tenured associate professor at Wayne State University in Detroit, Michigan between 1995 and 2006. She has been an Independent Consultant in San Luis Obispo and lecturer at Cal Poly since 2006. Her academic interests are mainly in research with focus areas of waste containment materials and systems, reuse of byproducts, nondestructive testing, image analysis, and surface topography investigations. Her research projects have mainly been funded by the National Science Foundation (NSF). She received continuous funding from NSF between 1997 and 2006 starting with a CAREER Award. She also received external funding from American Association for Advancement of Science, Michigan Department of Transportation, and various private organizations. She has interests in experimental analysis and development of test methods and guides. She has been extensively involved with the American Society for Testing and Materials (ASTM) and serves as an Editorial Board Member of the ASTM Geotechnical Testing Journal and the chair of the Committee on Hydrologic Properties and Hydraulic Testing of soils. She has received ASTM Awards for standards development and technical publication. She also serves on various committees of American Society of Civil Engineers and Transportation Research Board and participated in numerous seminar, symposium, workshop, and conference organization activities. Dr. Yesiller is highly qualified to serve as the Interim Director of the Institute due to her background and expertise, research record, and professional service activities.

The Executive Committee will consist of the Institute Director and faculty members of the Institute with relevant and complementary research and education interests closely

aligned with the Mission of the Institute. The initial membership of the Executive Committee represents a group of faculty with direct research, teaching, and professional service interests linked with the Institute. Dr. Hanson and Dr. Vigil have expertise in solid waste and byproduct management including recycling, reuse, and containment. Dr. Vanasupa has been extensively involved with sustainable engineering and global educational initiatives. Dr. Golden will provide a direct link to the College of Agriculture, Food, and Environmental Sciences in relation to investigation of agricultural wastes and byproducts. Dr. Singh has expertise in packaging and provides a link to the Orfalea College of Business in relation to investigation of manufacturing processes for waste reduction and reuse applications. The Executive Committee will work closely with the Institute faculty to identify research and educational priorities and activities for the Institute as well as participate in securing funds and disseminating the results of Institute activities. The Executive Committee and Institute faculty will facilitate and contribute to the development of the Masters Degree Program in Sustainable Environmental/Waste Management. Member faculty of the Institute will teach various courses in the program and direct research and advise students in relevant research topics. The make-up of the Executive Committee will continue to evolve and members will rotate as leaders around campus emerge in research and education related to the activities of the Institute.

Executive Committee

- Dr. Nazli Yesiller: geoenvironmental engineering, containment materials and systems, nondestructive testing, image analysis
- Dr. Bruce L. Golden, Department Head – Dairy Science: genetic evaluation of livestock, animal identification, and livestock breeding
- Dr. James L. Hanson, Associate Professor – Civil and Environmental Engineering Department: geotechnical and geoenvironmental engineering, waste containment systems, heat transfer analysis
- Dr. Jay Singh, Associate Professor – Industrial Technology Program, Orfalea College of Business: packaging and life cycle assessment
- Dr. Linda Vanasupa, Professor - Materials Engineering Department: materials engineering, engineering education, sustainable engineering, global education
- Dr. Samuel A. Vigil, Professor – Civil and Environmental Engineering Department: environmental engineering, solid waste management

The Institute will have member faculty, who will participate in and contribute to determining the direction of its activities. The members will be responsible for pursuing external funding opportunities and will benefit from seed funding opportunities made available through the Institute. The members will also be responsible for supervising individual research projects and disseminating the results in reports, papers, presentations, and through other venues and will be responsible for participating in and organizing Institute seminars, training courses, workshops, and conferences. A preliminary list of members of the Institute is provided below. Additional members from Colleges of Science and Mathematics, Business, and Agriculture, Food, and Environmental Sciences will be identified in collaboration with the Deans of these Colleges. Support Letters provided by the Deans in Appendix B indicate the interest and support of multiple Colleges in the Institute. In addition, several members of the Institute have existing collaborations with member Colleges and with particular units such as the Environmental Biotechnology Institute; Project Based Learning

Institute; and Industrial Technology Program. These members will assist in further identification of faculty for collaborative and cooperative participation in the activities of the Institute. The existing collaborations between the various member faculty of the Institute and also between the members and faculty not identified by name in this section can be seen in the resumes provided in Appendix C and publications provided in Appendix D. It is expected that faculty members affiliated with various departments or programs at Cal Poly will collaborate with and participate in the activities of the Institute. The member faculty of the Institute will continue to evolve as projects and activities of the Institute develop over time.

- Dr. Isaac Chang, Industrial Technology Program, Orfalea College of Business: product lifecycle management, alternative energy applications, energy conversion
- Dr. Ray Fernando, Department of Chemistry and Biochemistry: polymers and coatings
- Dr. Gregg Fiegel, Chair, Department of Civil and Environmental Engineering: Engineers without Borders, sustainable infrastructure, professional training, student activities, and graduate education
- Dr. Daniel Jansen, Associate Professor – Civil and Environmental Engineering Department: structural engineering, civil engineering materials, reuse of byproducts
- Dr. Andrew Kean, Assistant Professor – Mechanical Engineering Department: combustion and pollution emissions, energy
- Dr. Trygve J. Lundquist, Assistant Professor – Civil and Environmental Engineering Department: environmental engineering, animal wastes, and waste-to-energy
- Dr. Yarrow Nelson, Professor – Civil and Environmental Engineering Department and Environmental Biotechnology Institute: environmental engineering, analytical investigations, waste-to-energy, and conversion technologies
- Dr. Ashraf Rahim, Assistant Professor – Civil and Environmental Engineering Department: pavement engineering, reuse of byproducts
- Dr. Ken Riener – Orfalea College of Business: global cost of alternative energy sources, effect of carbon credits
- Dr. Pete Schwartz – Physics: renewable energy, appropriate technology for the poor, financial analysis of energy transitioning
- Dr. Keith Vorst, Assistant Professor – Industrial Technology Program, Orfalea College of Business: packaging

The Institute will be supported by an External Advisory Board that will include distinguished representatives from academia as well as waste, recycling, manufacturing, engineering, and service industries. The Board will provide general direction and guidance for the activities of the Institute and provide a bridge between academia and industry. The Board will also assist with identifying potential research and education topics and support mechanisms. The External Advisory Board will have at least one annual meeting. The External Advisory Board will nominate a chair, who will also serve as liaison to the Executive Committee. A preliminary list, with general categories in some cases, for the External Advisory Board membership, is presented below. Additional members and specific members in certain categories will be identified in collaboration with the Deans of the Colleges participating in the Institute subsequent to formal establishment of the Institute. The membership in the External Advisory Board will be on a rotational basis with renewable appointments of 2 or 3 years.

External Advisory Board (Preliminary List)

- Mr. Robert H. Davis: Waste Systems International Inc.
- Mr. Jim Little: Waste Connections, Inc.
- Dr. Conrad Young: Century Tubes Inc.
- Dr. Craig H. Benson: University of Washington
- Dr. David E. Daniel: University of Texas-Dallas
- Dr. Majdi Othman: Geosyntec Consultants
- Mr. Paul Orfalea: Kinko's-FedEx
- Mr. Ken Edwards: Dunn-Edwards Paint
- Mr. Bob Gallo: Gallo Wines
- GSE Inc.
- Mr. Pat DeRuda: Waste Management
- Dr. Robert Ham: Emeritus University of Wisconsin-Madison
- Electronics Industry
- Transportation Industry
- Mining Industry
- Electric Power Industry

The Institute will also establish national and international collaborations with partner organizations including universities, corporate entities, and governmental agencies. Jointly managed research and education projects; use of industry partners' facilities for field-scale investigations; joint professional activities; and collaborative training courses, seminars, and workshops will constitute the majority of activities to be undertaken with the Partner Organizations. A preliminary list is provided for the Partner Organizations below. The list of the Organizations will be finalized subsequent to formal establishment of the Institute. Formation of research groups with regard to specific topics and associated partners will be pursued subsequent to the establishment of the Institute. An example includes a Landfill Research Group that will include relevant faculty members of the Institute and Partner Organizations. The Group will focus on specific projects that are relevant for landfills. Common research conducted by the Group will benefit all members and all of the resulting materials such as data, analyses methods, test methods, guidelines, specifications, and other publications will be accessible by all members.

Partner Organizations (Preliminary List)

- Waste Connections Inc.
- effENERGY LLC
- adaptiveARC, Inc.
- Waste Systems International, Inc
- Synergy Power Corporation
- University of Wisconsin-Madison
- Purdue University
- Kyoto University – Japan
- Sauk Trail Hills Development
- Los Corralitos Regional Landfill

- Anchorage Regional Landfill
- Vancouver Landfill – Canada
- Monterey Regional Waste Management District
- Lucas Heights Landfill – Australia
- Rubber Recovery, Inc.
- Nippon Koei Co. Ltd. – Japan

An organizational flowchart for the Institute is presented in Figure 1. The flowchart depicts relationships between Institute constituents within the framework of the University administration.

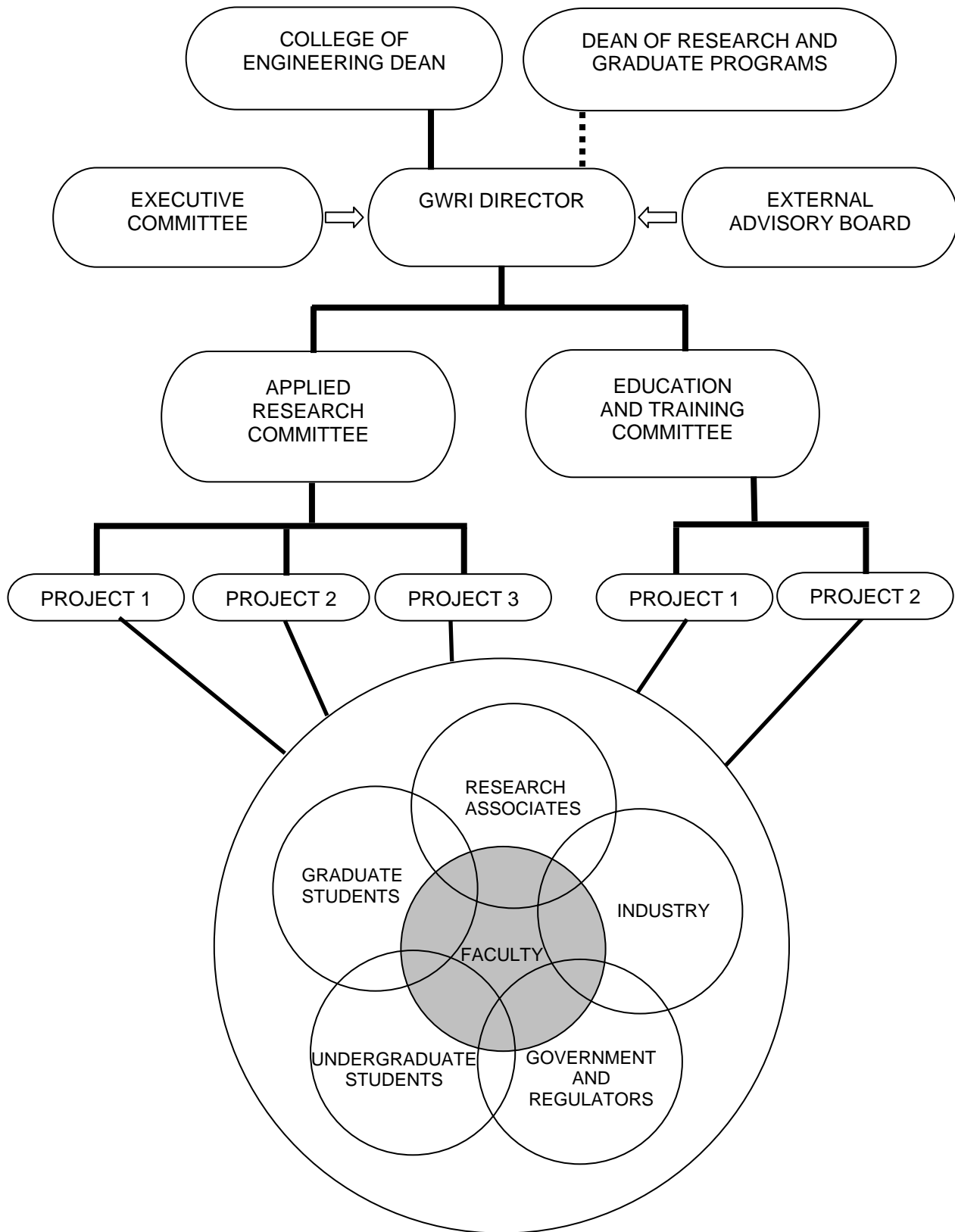


Figure 1. Organizational Flowchart for GWRI

PERSONNEL AND FACILITIES

Initial facilities and personnel requirements for the Global Waste Research Institute consist of a Director position and office space for the Director. An Administrative Assistant/Assistant Director Position and office space for the Assistant will be required in the second year of operations of the Institute. The Director and Assistant will manage the Institute in the short as well as the long term. Additional personnel will be hired over time for supporting the research mission of the Institute. The additional personnel will mainly consist of Research Associates. The Research Associates will be responsible for conducting research projects, which cannot be fully accomplished with undergraduate and Master's level graduate students. The Research Associates will work closely with the faculty members of the Institute. In addition to conducting research, the Research Associates will also assist with teaching of courses for the newly established Master's Degree Program or other courses as needed. It is expected that the first cycle of additional personnel would join the institute in the third or fourth year of operations.

Additional office space will be required for the Research Associates. It may be possible to house the Research Associates in existing office and laboratory settings based on their expertise and work areas. Initially, the research studies will be conducted in existing laboratory facilities on campus. We expect that field investigations will also be conducted by the Institute faculty at various locations. Office space, laboratory space, and equipment solely devoted to Institute activities will be required over time as the operations of the Institute expand. We estimate that combined laboratory and office space with an area on the order of 2000 ft² will be required by the fifth year of operations of the Institute. Discussions are underway with the College of Engineering for identifying suitable space for the Institute.

FUNDING AND BUDGET

The Global Waste Research Institute at Cal Poly will be formed as a collaborative effort between academia and industry. Initial funds in the amount of \$1,000,000 sequenced funding (\$200,000 at onset and \$100,000/year thereafter) has already been committed by Waste Connections Inc. as indicated by the Support Letter provided in Appendix A. Institute faculty will pursue additional funding from private industry and California Environmental Protection Agency. Funding will be pursued for projects in areas that constitute research priorities for the Institute from federal agencies including the National Science Foundation, U.S. Environmental Protection Agency, Department of Energy, Department of Defense, Department of Commerce, and Department of Agriculture. Also, funding will be sought for procurement of major equipment through various equipment funding opportunities available from the federal agencies. In addition, funding will be pursued from state agencies such as California Department of Transportation. Funding will also be pursued in the form of designated funding from California state government. The Institute has several priority research and education areas that coincide with the priority areas of the state government such as alternative energy and high-tech industries, which will enable the possibility of obtaining designated funding. The Director will actively pursue funding and also closely collaborate with affiliated Institute faculty and the Executive Committee in pursuing the various funding opportunities described above. Examples of existing, recent, and current externally funded projects conducted by Cal Poly faculty in areas related to the mission and activities of the Institute are provided in Appendix E.

The Institute faculty will have dual functions in funding related activities. The Institute will provide funds to faculty (and their collaborators as appropriate) for conducting research and education studies. The source of these funds would be donations or grants (e.g., obtained through foundations). It is intended that such funds be distributed to member faculty on a competitive basis (with a small-scale RFP within the Institute). The modest funds envisioned would help faculty conduct small-scale investigations and assist with developing plans for major collaborations and major topics of research. At the same time, the faculty will be actively engaged in pursuit of external funding for projects related to the Mission of the Institute. The return on indirect costs to the Institute will be used for operational costs and assistance with research costs. This dual function and funding cycle will allow for continual operations of the Institute.

An itemized budget is provided in Table 1 for estimated revenues and expenses of the Institute for an initial period of five years. Start-up funds in the amount of \$25,000/year are requested for the first two years of the operation of the Institute. In the first year, this amount will augment the funds to be provided by Waste Connections Inc. to support the Institute Director and student assistants, and provide seed funds to member faculty. In the second year, the requested amount will augment funding from Waste Connections Inc. to support the Institute Director, an Assistant and the organization of the conference series to be affiliated with the Institute. We expect that external funding in addition to the funds provided by Waste Connections Inc. will become available starting in Year 2 or 3 with the amount expected to increase over time. We envision funding at the level of \$400,000 to \$600,000 for the Institute on average on an annual basis (including donations for operations, sponsored research, and fees generated by short courses and conferences). Actual revenues will be higher than the

levels presented in Table 1 due to the 25% return on overhead in research expenditures exceeding \$100,000/year. Funds will be used for hiring Research Associates starting with the third year of operations. Funds may also be used for creating office and laboratory space for the Institute. The compensation category overall includes the salary for the Director, the Assistant, Research Associates, and students who may be hired directly by the Institute for research and education projects. The expenses include funds for compensation, funds for research and education activities as well funds for various services, materials, and supplies. Whereas it is envisioned that conferences and short courses will be integrated into Institute activities, these are not included as revenue streams during the first five years as profit from initial training efforts are expected to be modest. The initial efforts in this regard will focus on establishing a global reputation for the Institute, and not on profit. As the reputation of the Institute is established, such revenue stream is expected to contribute to an operating budget. Some research investigations may lead to intellectual property and possible financial benefits to the Institute and university. The Intellectual Property Policy for Cal Poly is provided in Appendix F for the activities of the Institute.

Table 1 – Five Year Budget Estimate for Global Waste Research Institute

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Waste Connections Inc.	200,000	100,000	100,000	100,000	100,000
Start-Up Funds	25,000	25,000			
External Funds		50,000	150,000	250,000	300,000
Total	225,000	175,000	250,000	350,000	400,000
Expenses					
Compensation	150,000	125,000	180,000	195,000	260,000
Services, Materials, Supplies	5,000	10,000	10,000	15,000	20,000
Research Funds	50,000	25,000	35,000	80,000	80,000
Education Funds	20,000	15,000	25,000	60,000	40,000
Total	225,000	175,000	250,000	350,000	400,000

BYLAWS

BYLAWS OF THE GLOBAL WASTE RESEARCH INSTITUTE California Polytechnic State University, San Luis Obispo

These bylaws are applicable within the authorization established by the Board of Trustees of The California State University and the California Polytechnic State University, San Luis Obispo (referred to in these Bylaws as Cal Poly or the University).

ARTICLE I - NAME

The name of this organization shall be the Global Waste Research Institute, referred to in these bylaws as the Institute.

ARTICLE II – PURPOSE AND POLICIES

Section 1 – Purpose

The primary purpose of the Institute will be to advance state-of-the-art and state-of-the-practice in development of sustainable technologies and policies for management of existing, new, and emerging wastes and byproducts through complementary research, development, and education. The Institute will operate at the forefront of engineering and science to develop products, processes, practices, and policies by both conducting innovative research and educating stakeholders. In addition, the Institute will foster interaction between the University and industry, consistent with the overall goals of Cal Poly.

The Institute will serve as a vehicle for securing industrial sponsorship and support to sustain waste management, recycling, and byproduct reuse-oriented projects at the Institute.

The Institute will be financed by gifts, grants, contracts, and revenue generated by Institute activities.

Section 2 – Policies

The policies of this Institute shall be in harmony with the policies of the California State University, the California Polytechnic State University, San Luis Obispo, and the California Polytechnic State University Corporation.

ARTICLE III – PARTICIPANTS

Section 1 – Participants

Participants may be faculty, staff, and students of the University or Corporation, and affiliated researchers, consultants, industry representatives, and others interested in the Institute.

a. Faculty

Faculty participants are persons appointed by the University to faculty rank and participating in the activities of the Institute.

b. Staff

Staff participants are persons employed by the University or Corporation and participating in the activities of the Institute.

c. Students

Student participants are persons engaged in study at the University on either a full-time or part-time basis and participating in the activities of the Institute.

d. Affiliated Researchers

Affiliated researchers are faculty or other persons from outside the University who carry out or collaborate on research and/or other projects under auspices of the Institute.

e. Industry Representatives

Industry representatives are persons actively engaged in a variety of industries as practitioners, vendors, or industry advocates.

f. Association Representatives

Association representatives are persons affiliated with a professional or trade association/organization representing Institute interests and activities.

Section 2 – Approval to Participate

All interested faculty, staff, and students of the University or Corporation, and interested parties outside of the University, are eligible to participate in the Institute, upon approval by the Executive Committee and the Director. Any faculty, staff, student, or outside participant may recommend individuals for participation in the Institute. Such recommendations shall be made to the Director.

Section 3 – Terms and Conditions

Terms and conditions of participation shall be determined by the Director, in consultation with the Executive Committee.

Section 4 – Role of Participants

Participants are encouraged to be actively engaged in the activities of the Institute. They may propose programs to be implemented by the Institute. If approved, these programs will

receive Institute support as necessary and possible. Participants will have priority consideration in Institute activities and interaction with industry.

Participants are expected to provide support to the programs of the Institute and assist the Director in program development.

ARTICLE IV – ADMINISTRATION

Section 1 – Administration

The Institute administration shall include a Director, Executive Committee, and External Advisory Board.

Section 2 – Director

The Institute will be administered by a Director, appointed by the Dean of College of Engineering (“Dean”). The term of appointment is three (3) years. The appointment may be renewed at the discretion of the Dean of College of Engineering.

The Director may be an active Cal Poly faculty or staff member or may be hired from outside the University on a contract basis. A faculty/staff Director will serve on a released time or added compensation basis. The amount of time will vary from quarter to quarter and will depend on available funds and anticipated work load for the particular quarter. The Director will report to the Dean of College of Engineering.

The Director shall submit an annual report following each academic year to the Dean of College of Engineering. The report shall include a summary of the year’s activities and a financial report, as well as information on scholarly publications and technical reports, students supported by the Institute, theses and senior projects completed under the auspices of the Institute, honors and awards to faculty and students, and any other noteworthy achievements. Other reports will be submitted as required by the University for Centers and Institutes.

Section 3 – Executive Committee

The Executive Committee shall consist of six to eight members, including the Director. The balance shall consist of active faculty participants. The Director will make recommendations the Dean of College of Engineering for the appointment of members to the Executive Committee. One position on the Executive Committee will be recommended by the Dean of Research and Graduate Programs to provide internal/external oversight of committee activities.

The Executive Committee shall be responsible for: a) approving candidates for Institute participation; b) recommending members of the External Advisory Board; c) recommending Institute programs and activities; d) developing operating guidelines to implement Institute programs and activities; and e) advising the Director on matters of general policy and operations.

ARTICLE V – EXTERNAL ADVISORY BOARD

Section 1 – Membership

External Advisory Board (“Board”) members are those persons recommended by the Executive Committee and appointed by the Dean to serve in an advisory capacity to the Institute.

The Board shall be composed of a minimum of five (5) members representing a spectrum of expertise and background associated with academic, industry, and regulatory aspects of manufacturing, waste management and byproduct reuse fields.

The Board will be appointed by the Dean. Initial appointments of from one to three years may be used to stagger Board membership terms. Thereafter, terms will be three years. The Chair of the Board will be nominated and elected by the Board.

Section 2 – Powers and Duties

The Board shall provide advice and comment on Institute programs, shall engage in public relations and support activities for Institute programs, and shall provide overall guidance and direction to the Institute, and to the Dean, as appropriate.

Section 3 – Meetings

The Board will meet at least once a year to review Institute programs and to provide general direction to the Institute. The Board may elect to meet for special purposes at any other time upon agreement of a majority of Board members.

Section 4 – Number constituting a Quorum

A majority of Board members shall constitute a quorum.

ARTICLE VI – FISCAL POLICIES

Section 1 – Fiscal Year

The fiscal year shall correspond to that of the Corporation.

Section 2 – Accounts and Audit

The books and accounts of the Institute shall be kept by the Corporation and shall be audited annually in accordance with Corporation policies.

Section 3 – Funding

Funding for the Institute shall come from private or government grants and contracts, gifts, and fees from Institute-generated short courses, conferences, and publications.

Section 4 – Dissolution

In the event the Institute is dissolved, any assets remaining after payment of all debts and liabilities shall be distributed to the Corporation in trust for the College of Engineering. If debts and liabilities exceed assets, the College of Engineering will be responsible for said debts and liabilities.

ARTICLE VII – AMENDMENTS

The bylaws may be amended by a majority vote of the Executive Committee with the approval of the Dean of College of Engineering and the Dean of Research and Graduate Programs. Any participant in the Institute may propose amendments to the bylaws.

State of California

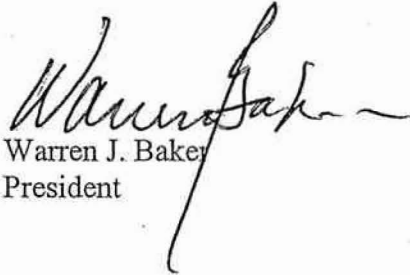
Memorandum

CAL POLY

SAN LUIS OBISPO
CA 93407

To: Rachel Fernflores
Chair, Academic Senate

Date: September 2, 2009

From: 
Warren J. Baker
President

Copies: R. Koob
M. Noori
J. Hanson
N. Yesiller
S. Opava

Subject: Response to Academic Senate Resolution AS-679-09
Resolution on Proposal for the Establishment of the Global Waste Research Institute

Based upon the above subject Resolution, the positive endorsement by the Academic Deans' Council at its August 31, 2009 meeting, as well as the recommendation of Provost Robert Koob, I am pleased to approve the establishment of the Global Waste Research Institute (GWRI).